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EXAMINER	
MANCHO, RONNIE M	

ART UNIT	PAPER NUMBER
3663	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/800,178	Applicant(s) SHARPE ET AL.
	Examiner Ronnie Mancho	Art Unit 3663

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 March 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *3/12/04*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 112

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Regarding independent claim 1, line 3, the limitation "a situation" is undefined. It is not clear if the applicant is referring to when a satellite is not in view or a time when a navigation system is in a tunnel or some other geographic area where satellite signals cannot be received for example. Further, the limitation "a time period" is not defined since a time period could be any time.

The above rejection also applies to claim 17.

In claim 9, the applicant claims "one of two frequencies from one or more satellites are available". The applicant is advised to changed "are available" to --is available-- for consistency. Then later in the claim, the applicant claims "another one of the two frequencies". This is contradictory since the applicant had insisted in the claim preamble that only one of two frequencies should be available. That is if only one frequency is available, then the other frequency is unavailable for use with the said one frequency for processing.

The dependent claims are rejected for depending on the rejected base claims.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

4. Claims 1-20 are rejected under 35 U.S.C. 102(b) as being anticipated by Lin (US2001/0020216).

Regarding claim 1, Lin (abstract, figs. 5-11; pages 6-12 a) discloses (in a system for navigating an object based on code and carrier-phase measurements obtained using signals on a first frequency and signals on a second frequency from a plurality of satellites), a method for continuing dual-frequency navigation in a situation where signals from a respective satellite on the first frequency are lost for a time period, the method comprising:

performing dual-frequency navigation before the time period, including computing smoothed code measurements and corrections to an ionospheric model based on code and carrier-phase measurements obtained using signals from the respective satellite on both the first and second frequencies;

performing backup navigation during the time period by synthesizing a carrier-phase measurement on the first frequency from a carrier-phase measurement on the second frequency and from the corrections to the ionospheric model computed prior to the time period; and

transitioning to dual-frequency navigation using signals from the respective satellite on both the first and second frequencies in response to resumption of receiving signals from the respective satellite on the first frequency.

Regarding claim 2, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 1 wherein computing the smoothed code measurements comprises:

smoothing a code measurement with a combination of carrier-phase measurements, the combination having an ionospheric delay that matches an ionospheric delay in the code measurement.\

Regarding claim 3, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 1, wherein performing dual-frequency navigation further comprises:

obtaining a modeled ionospheric bias term computed using the ionospheric model;

computing a measured ionospheric bias term using the smoothed code measurements; and

computing a correction to the modeled ionospheric bias term by taking a difference between the measured and modeled ionospheric bias terms.

Regarding claim 4, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 3 wherein performing dual-frequency navigation further comprises:

obtaining a modeled ionospheric rate term computed using the ionospheric model;

computing a measured ionospheric rate term using differences of carier-phase measurements between two measurement epochs; and

computing a correction to the modeled ionospheric rate term by taking a difference between the measured and modeled ionospheric rate terms.

Regarding claim 5, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 1 wherein performing backup navigation further comprises:

obtaining a modeled ionospheric bias term computed using the ionospheric model;

computing an estimated ionospheric bias term using the modeled ionospheric bias term and the corrections to the ionospheric model computed before the time period;

computing the synthesized carrier-phase measurement on the first frequency using the estimated ionospheric bias term and the carrier-phase measurement on the second frequency.

Regarding claim 6, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 1 wherein performing backup navigation further comprises:

computing estimated smoothed code measurements on both the first and second frequencies using the synthesized carrier-phase measurement on the first frequency, the carrier-phase measurement on the second frequency, and computation results obtained based on signals from the respective satellite on both the first and second frequencies received at the object before the time period.

Regarding claim 7, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 6 wherein performing backup navigation further comprises computing updated corrections to the ionospheric model based on the corrections to the ionospheric model, the estimated smoothed code measurement on the second frequency, and a code measurement obtained using signals on the second frequency.

Regarding claim 8, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 1 wherein transitioning to dual-frequency navigation comprises:

determining whether the time period exceeds a predetermined threshold in response to a determination that the time period does not exceed a predetermined threshold, determining whether a difference between a measured carrier-phase range and a synthesized carrier-phase

range corresponding to the first frequency is sufficiently close to an integer number of the wavelength corresponding to the first frequency; and

in response to a determination that the difference between the measured carrier-phase range and the synthesized carrier-phase range is sufficiently close to an integer number of the wavelength, adjusting an estimated ambiguity value associated with the measured carrier-phase measurement or adjusting an estimated offset between a code measurement on the first frequency and a carrier-phase combination having an ionospheric delay that matches the ionosphelic delay in the code measurement.

Regarding claim 9, Lin (abstract, figs. 5-11; pages 6-12 a) discloses in a system for navigating an object based on code and carrier-phase measurements obtained using signals from a plurality of satellites, a method for performing backup dual-frequency navigation when signals on one of two frequencies from one or more satellites are unavailable, comprising:

for each satellite from which signals on one of two frequencies are unavailable, generating a synthesized carrier-phase measurement on the one of the two frequencies from a measured carrier-phase measurement obtained using signals from the respective satellite on another one of the two frequencies, and from a first set of computation results obtained with respect to the respective satellite during steady-state processing when signals on both of the two frequencies were available from the respective satellite;, and

generating smoothed code measurements on the two frequencies from the measured carrier-phase measurement, the synthesized carrier-phase measurement, and a second set of computation results obtained during steady-state processing when signals on both of the two frequencies were available from the respective satellite.

Regarding claim 10, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 9 wherein the first set of computation results include corrections to an ionospheric model.

Regarding claim 11, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 9, further comprising:

updating the corrections to the ionospheric model.

Regarding claim 12, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 10 wherein the corrections to the ionospheric model include an ionospheric bias term and an ionospheric rate term.

Regarding claim 13, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 10 wherein the first set of computation results include those computed from smoothed code measurements.

Regarding claim 14, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 13 wherein the smoothed code measurements are computed by forming combinations of carrier-phase measurements each having an ionospheric delay that matches an ionospheric delay in a corresponding code measurement, and by smoothing the code measurement with the corresponding combination of carrier-phase measurements to remove multipath errors in the code measurement.

Regarding claim 15, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 14 wherein the first set of computation results include those computed from smoothed offsets each between a smoothed code measurement and a carrier-phase combination corresponding to the code measurement.

Regarding claim 16, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the method of claim 15 wherein the second set of computation results include the smoothed offsets.

Regarding claim 17, Lin (abstract, figs. 5-11; pages 6-12 a) discloses a system for navigating an object based on code and carrier-phase measurements obtained using signals on a first frequency and signals on a second frequency from a plurality of satellites, a computer medium storing therein computer readable instructions that when executed by a computer performs a method for continuing dual-frequency navigation in a situation where signals from a respective satellite on the first frequency are lost for a time period, the instructions comprising:

instructions for performing dual-frequency navigation before the time period by computing smoothed code measurements and corrections to an ionospheric model based on code and carrier-phase measurements obtained using signals from the respective satellite on both the first and second frequencies before the time period;

instructions for performing backup navigation during the time period by synthesizing a carrier-phase measurement on the first frequency from a carrier-phase measurement on the second frequency and from the corrections to the ionosphelic model computed prior to the time period; and

instructions for transitioning to dual-frequency navigation using signals from the respective satellite on both the first and second frequencies in response to resumption of receiving signals from the respective satellite on the first frequency.

Regarding claim 18, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the computer readable medium of claim 17 wherein the instructions for performing dual-frequency navigation further comprises:

instructions for smoothing a code measurement with a combination of carrier-phase measurements to form a smoothed code measurement, the combination having a ionospheric delay that matches an ionospheric delay in the code measurement; and

instructions for computing a correction to a modeled ionospheric bias term.

Regarding claim 19, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the computer readable medium of claim 17 wherein the instructions for performing backup navigation further comprises:

instructions for obtaining a modeled ionospheric bias term;

instructions for computing an estimated ionospheric bias term using the modeled ionospheric bias term and the corrections to the ionospheric model computed before the time period;

instructions for computing the synthesized carrier-phase measurement on the first frequency using the estimated ionospheric bias term and the carrier-phase measurement obtained using signals on the second frequency.

Regarding claim 20, Lin (abstract, figs. 5-11; pages 6-12 a) discloses the computer readable medium of claim 17 wherein the instructions for transitioning to dual-frequency navigation comprises:

instructions for determining whether the time period exceeds a predetermined threshold;

instructions for determining, in response to a determination that the time period does not exceed a predetermined threshold, whether a difference between a measured carrier-phase range and a synthesized carrier-phase range corresponding to the first frequency is sufficiently close to an integer number of the wavelength corresponding to the first frequency; and

instructions for adjusting, in response to a determination that the difference between the measured carrier-phase range and the synthesized carrier-phase range is sufficiently close to an integer number of the wavelength, an estimated ambiguity value associated with the measured carrier-phase measurement or an estimated offset between a code measurement on the first frequency and a carrier-phase combination having an ionospheric delay that matches the ionospheric delay in the code measurement.

Conclusion

5. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The following: US006664923B1, US20050080560A1, US005416712A, US005805108A, and US006311129B1 all disclose a navigation system.

Communication

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ronnie Mancho whose telephone number is 571-272-6984. The examiner can normally be reached on Mon-Thurs: 9-5.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on 571-272-6878. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Ronnie Mancho
Examiner
Art Unit 3663

6/27/05

JACK KEITH
PRIMARY EXAMINER
SPE 3663